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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

Branch: Computer Science and Engineering **Duration: 3 hrs.**

Course Code: 22CS7PEHCI **Max Marks: 100**

Course: Human Computer Interaction, Virtual and Augmented Reality

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Discuss the stages of human information processing as they relate to human-computer interaction. How can an in-depth understanding of these stages inform the design of more effective user interfaces? Provide specific examples to illustrate your points.	*CO1*	*PO1*	**10**
	b)	Analyze the differences between command-line interfaces and graphical user interfaces in terms of cognitive load on users.	*CO 1*	*PO 1*	**5**
	c)	Evaluate the effectiveness of using auditory feedback in user interfaces for visually impaired users.	*CO 1*	*PO 1*	**5**
		OR			
2	a)	Considering the diverse range of human abilities and characteristics, propose a set of design principles that ensure accessibility and usability for a broad user base. How can these principles be applied to the development of a public information kiosk?	*CO 1*	*PO 1*	**10**
	b)	How would you design a touchscreen interface for elderly users to accommodate potential declines in motor precision?	*CO 1*	*PO 1*	**5**
	c)	How would you apply the concept of affordances to improve the usability of a mobile application's navigation menu?	*CO 1*	*PO 1*	**5**
		UNIT – II			
3	a)	Conduct a comprehensive analysis of the impact of various interaction styles on user performance and satisfaction?	*CO 1*	*PO 1*	**10**
	b)	Explain the concept of goal and task hierarchies in cognitive modelling. How do they contribute to the analysis of user tasks within an HCI context?	*CO 1*	*PO 1*	**5**
	c)	Discuss the role of cognitive models in human-computer interaction (HCI) design. How do they assist in understanding user behaviour and informing interface design decisions?	*CO 1*	*PO 1*	**5**
		OR			

	4	a)	Do a keystroke-level analysis for opening up an application in a visual desktop interface using a mouse as the pointing device, comparing at least two different methods for performing the task. Repeat the exercise using a trackball. Consider how the analysis would differ for various positions of the trackball relative to the keyboard and for other pointing devices.	*CO 1*	*PO 1*	**10**
		b)	Describe the concept of cognitive walkthroughs. How do they differ from other usability evaluation methods, and what are their advantages in assessing user interfaces?	*CO 1*	*PO 1*	**5**
		c)	Apply Norman's execution–evaluation cycle to a scenario where a user attempts to print a document but encounters an error. Identify potential breakdowns in the interaction process.	*CO 1*	*PO 1*	**5**
			UNIT - III			
	5	a)	Discuss the following application of AR i. Astronomical observation ii. Civil Construction and Architecture iii. Collaboration iv. Medical	*CO 2*	*PO 2*	**10**
		b)	Discuss why the following applications are not AR and justify using Azuma's conditions. i. Traditional Video Games (e.g., "Super Mario") ii. Social Media Platforms (e.g., Facebook, Instagram) iii. Photo Editing Software (e.g., Photoshop) iv. Video Streaming Services (e.g., Netflix, YouTube) v. Weather Forecasting Apps (e.g., The Weather Channel)	*CO 2*	*PO 2*	**10**
			OR			
	6	a)	Discuss the following application of AR i. Education and teaching ii. Navigation iii. Military and war iv. Games	*CO 2*	*PO 2*	**10**
		b)	Discuss why the following applications are not AR and justify using Azuma's conditions. i. Text Editors (e.g., Microsoft Word, Google Docs) ii. Digital Mapping Services (e.g., Google Maps) iii. Virtual Reality (VR) Systems (e.g., Oculus Rift, HTC Vive) iv. Digital Audio Workstations (DAWs) (e.g., Ableton Live, FL Studio) v. E-commerce Websites (e.g., Amazon)	*CO 2*	*PO 2*	**10**
			UNIT - IV			
	7	a)	Discuss the image formation in a pinhole camera	*CO 2*	*PO 2*	**10**
		b)	Discuss the various types of classifications of tracking	*CO 2*	*PO 2*	**10**
			OR			
	8	a)	Discuss the various parameter for camera calibration	*CO 2*	*PO 2*	**10**

		b)	Discuss the sensor-based tracking	*CO 2*	*PO 2*	**10**
			UNIT - V			
	9	a)	Create an interactive text input box for the user?	*CO 3*	*PO 3*	**12**
		b)	i. How do you instantiate a new Game Object at runtime in Unity? ii. How can you detect collisions between two Game Objects in Unity?	*CO 3*	*PO 3*	**4+4**
			OR			
	10	a)	Create a Digital countdown timer with graphical display?	*CO 3*	*PO 3*	**12**
		b)	i. How do you detect when a player presses a specific key in Unity? ii. How can you make a Game Object rotate continuously in Unity?	*CO 3*	*PO3*	**4+4**

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